

**A. Cover Sheet** (Attach to front of proposal.)

1. Specify: ☒ agricultural project or ☐ individual application or  
☐ urban project ☐ joint application
2. Proposal title—concise but descriptive: \_\_\_\_\_
3. Principal applicant—organization or affiliation: Stevinson Water District
4. Contact—name, title: Robert D. Kelley, Jr., President
5. Mailing address: P.O. Box 818, Newman, CA 95360
6. Telephone: (209) 634-4908
7. Fax: (209) 634-2601
8. E-mail: kfk1aw@inreach.com
9. Funds requested—dollar amount: \$ 70,000.00
10. Applicant cost share funds pledged—dollar amount: \$ 339,100.00
11. Duration—(month/year to month/year): April 2001 to December 2004
12. State Assembly and Senate districts and Congressional district(s) where the project is to be conducted:  
Dennis Cardoza, District 26  
Dick Monteith, District 12
13. Location and geographic boundaries of the project: Confluences San Joaquin and Merced rivers
14. Name and signature of official representing applicant. By signing below, the applicant declares the following:  
— the truthfulness of all representations in the proposal;  
— the individual signing the form is authorized to submit the application on behalf of the applicant;  
— the applicant will comply with contract terms and conditions identified in Section 11 of this PSP.
- Robert D. Kelley, Jr.  
(printed name of applicant)
- Robert D. Kelley  
(signature of applicant)
- 2/12/01  
(date)

## **B. Scope of Work**

### ***Relevance and Importance***

#### **1. Executive Summary.**

The Stevinson Water District (SWD) located riparian to the Merced and San Joaquin Rivers, at the confluence of said rivers, delivers approximately 33,000 acre-feet of surface water to approximately 13,000 acres of farm lands on an annual basis. James J. Stevinson, a corp. (Stevinson), owns **95 %** of SWD lands. The SWD has significant contractual and appropriative water rights from the Merced River watershed. SWD delivers surface water to its' district as well as a neighboring district, Merquin County Water District (MCWD), pursuant to contractual obligations. The SWD delivers surface water to other districts and individuals not under any contractual obligations. Both districts, SWD and MCWD, lie under a high water table and desire to improve the water efficiency elements of their operations and develop improved conjunctive use of ground and surface water. It is through these water efficiency programs, SWD could make an increasing amount of surface water available to market out of district to programs like CALFED. SWD is presently working with programs like pipeline, reservoir improvements, wetland enhancement and wetland restoration projects. It is expected that SWD would have approximately 10,000 acre-feet of water available for export out of district in near future.

James J. Stevinson a corp. (Stevinson) had initiated wetland improvement, enhancement, and reservoir improvement projects, (Stevinson Project), in partnership with the U.S. Fish and Wildlife Service (FWS), the North American Wetlands Conservation Council (NAWCA), Ducks Unlimited (DU), and Riviere & Associates involving riparian wetland habitat improvements throughout the Stevinson Water District. This effort involves habitat restoration and enhancement and water management improvements on over 1,500 acres of seasonal, semi-permanent and permanent wetlands on SWD. These improvements are located along approximately 18 miles of the San Joaquin River and five miles of the Merced River upstream from this waterway's confluence with the San Joaquin.

Riparian wetland restoration and enhancement in the SWD will provide important habitat benefits for wetland and riparian wildlife, and significantly improve water management capability. These water management improvements will increase SWD capability to provide downstream water utilization by reducing irrecoverable water losses and improving water quality.

Evaluating the environmental effectiveness of habitat development is an important process to ensure program goals are met, and to present alternatives for appropriate management. This proposal requests CALFED's assistance as a partner by funding the monitoring aspect of the Stevinson Project.

2. Statement of critical local, regional, Bay-Delta, state or federal water issues.

The Central Valley of California provides critical wintering habitat for over 60% of waterfowl that use the Pacific Flyway and 20% of all waterfowl in North America (Gilmer et al. 1982). Despite the importance of this region to waterbirds, nearly 95% of historical wetlands and 98% of riparian habitats in the Central Valley have been destroyed (Jones and Stokes Assoc. 1987). The Grassland Ecological Area, a habitat region neighboring the Stevinson Project, represents 30% of the remaining wetlands in the Central Valley and is the largest contiguous block of wetland habitat left in the Valley. The FWS has recognized the Central Valley as one of the most important wintering areas for waterfowl in the United States and has listed this region among its highest priority areas in the North American Waterfowl Management Plan. The Western Hemispheric Shorebird Reserve Network has designated the Grasslands as an international reserve for migrant and wintering shorebirds. The California Riparian Habitat Joint Venture has made the San Joaquin River and its floodplain a Flagship project recognizing its importance for local and migratory songbirds. The need for protecting, restoring, and enhancing wetland habitats within the Stevinson region is important for the maintenance of local and migratory wetland and riparian-dependent wildlife.

This cooperative project of riparian wetland restoration/enhancement being conducted on Stevinson lands will provide significant habitat benefits to wetland and riparian wildlife that depend upon the Grasslands region. The information provided by the monitoring program proposed in this grant request will quantify the habitat benefits provided by the Stevinson Project, and provide important management alternatives to optimize waterbird utilization of riparian wetlands in the Stevinson system.

The Stevinson Project and monitoring program will assist CALFED in meeting its objectives. The four primary objectives of CALFED are as follows:

Water Quality: Provide good water quality for all beneficial uses.

Ecosystem Quality: Improve and increase aquatic and terrestrial habitats and improve ecological functions in the Bay-Delta to support sustainable populations of diverse and valuable plant and animal species.

Water Supply Reliability: Reduce the mismatch between Bay-Delta water supplies and current and projected beneficial uses dependent on the Bay-Delta System.

Bay-Delta System Vulnerability: Reduce the risk to land use and associated economic activities, water supply, infrastructure, and the ecosystem from catastrophic breaching of Delta levees.

The Stevinson Project will help CALFED meet all four of its objectives in the following ways:

Water Quality: Over 1,500 acres of seasonal, semi-permanent and permanent riparian-oriented wetlands will be restored/enhanced through this effort. The proximity of these wetland habitats with the Merced and San Joaquin Rivers, coupled with the improved water management capability achieved with this project, will provide water quality improvement for the benefit of fishery resources (see Appendix 5) and other downstream water use.

Ecosystem Quality: The significant amount of riparian wetland habitat that will be restored/enhanced with this project will benefit myriad wetland and riparian wildlife (see Appendices 1, 2, 3, 4) that depend upon San Joaquin Valley wetland and riparian habitats to meet their life cycle requirements. The monitoring program proposed in this CALFED grant request will quantify these wildlife benefits and provide management alternatives to optimize waterbird utilization in the Stevinson system.

Water Supply Reliability / Bay-Delta System Vulnerability: The increased water management capability realized within the 1,500 + acres of wetlands involved with this project will significantly improve floodwater retention capability in the Stevinson system. These waters can be captured, retained and released in a more manageable timeframe for the benefit of downstream use and flood protection.

### 3. Nature, scope, and objectives

The Stevinson / East Side Canal Company (Stevinson) operates along the western edge of Merced County and delivers approximately 33,000 acre feet of water to about 13,000 acres of farm and ranch lands on an annual basis. In 2000, Stevinson developed a partnership with the U.S. Fish and Wildlife Service (FWS), the North American Wetlands Conservation Council (NAWCA), Ducks Unlimited (DU) and Riviere & Associates to restore and enhance riparian wetland habitats throughout the Stevinson Water District. This effort involves enhancing water management capability and habitat quality on over 1,500 acres of seasonal, semi-permanent and permanent riparian-oriented wetlands on Stevinson lands. These Stevinson landholdings are located along approximately 18 miles of the San Joaquin River and five miles of the Merced River upstream from this waterway's confluence with the San Joaquin.

Historically, the wildlife value of the wetland systems associated with the San Joaquin River Basin evolved through its connection to other important wetland habitats within California's Central Valley, including the Sacramento/San Joaquin Delta, the Sacramento Valley and the Tulare Basin. Thus, the Stevinson region was originally part of a continuum of wetland habitats which provided myriad opportunities for wildlife to meet their life history requirements (Fredrickson and Laubhan 1995). The Central Valley historically held some of the largest populations of migratory waterfowl in North America, and today, provides critical habitat for 60% of wintering waterfowl in the

Pacific Flyway (Gilmer et al. 1982). Wetland birds and mammals inherent to the San Joaquin River Basin are listed in Appendices 1 and 2 respectively.

Riparian habitats historically served as corridors between rivers, wetlands and upland areas and supported the most diverse wildlife populations in California (Jensen et al. 1993). Riparian habitats have an intrinsically high wildlife value as 75% of California's wildlife species use these systems (Palmer 1993, Krueper 1993). Riparian forests in the San Joaquin River Basin are particularly important to migratory wildlife in that they provide resources not found in the surrounding environment which is characterized by an arid climate and low precipitation (Krueper 1993, San Joaquin Valley Drainage Program 1990). Riparian birds and mammals found in the San Joaquin River Basin riparian areas are listed in Appendices 3 and 4 respectively.

Historically, the riparian areas and associated wetlands in the San Joaquin River Basin significantly contributed to the value of aquatic habitat for fisheries. Riparian areas benefit fisheries in many ways, including providing habitat, reducing the impact of floods and droughts on streamflows, limiting erosion, and reducing sedimentation and pollution (Jensen et al. 1993). The network of wetland systems in the San Joaquin Basin contributes to the quality of aquatic habitat by filtering out nutrients and other pollutants and absorbing floodwaters. The San Joaquin River Basin, in its pristine condition, supported abundant populations of native freshwater and anadromous fishes (San Joaquin Valley Drainage Program 1990). Native fish populations have since declined and have been replaced by introduced species that are more tolerant to the altered hydrology and poorer water quality that exists today (San Joaquin Valley Drainage Program 1990). One of the greatest impacts to the stretch of San Joaquin River associated with Stevinson lands can be attributed to the Central Valley Project and construction of Friant Dam which decimated anadromous fish populations (Palmer 1993, San Joaquin Valley Drainage Program 1990). Friant Dam, which diverts the majority of the water that used to flow downstream, has drastically changed historical flow patterns, spawning grounds and riparian vegetation (Jensen et al. 1993). Fish species inherent to the San Joaquin River Basin are listed in Appendix 5.

The water leaving the Sierra Nevada Mountains, the primary source of the San Joaquin River, is of high quality, but deteriorates after entering the Central Valley (Palmer 1993, Dubrovsky et al. 1998). The most significant causes of reduced quality and pollution in the system include modified hydrology, agricultural drainage, habitat alteration, erosion and sedimentation (Palmer 1993). The historically significant San Joaquin River streamflow near Stevinson lands has been diverted for agricultural uses at Friant Dam. The virtual absence of downstream flows has increased temperatures and reduced the dilution capacity of the San Joaquin River, resulting in decreased oxygen levels and increased availability and concentrations of nutrients and other pollutants (Palmer 1993, Dubrovsky et al. 1998). Agricultural pesticides, such as organophosphate and organochlorine insecticides, are considered the main cause of toxicity in the San Joaquin River system (Dubrovsky et al. 1998). Sediment-bound organochlorine insecticides are transported into the waterways through surface runoff, erosion and sedimentation which have accelerated with the loss of riparian and wetland systems. The reduction of riparian

vegetation which has occurred in the San Joaquin River Basin has increased erosion and water temperature, releasing sediment-bound nutrients and pollutants and decreasing metabolization of pollutants. Riparian wetland systems play a vital role in water quality by preventing sediments, nutrients and pollutants from entering waterways.

SWD has a sizable supply of quality water, which it receives via its East Side Canal. The East Side Canal system captures quality waters that enter the region from Sierra foothill stream groups (Bear Creek, Owens Creek, Duck Slough and Deadman Creek, Fig. 1, see attachment). The ongoing Stevinson Project will facilitate retention of these freshwater resources and thus improve water supply and water quality for potential downstream water use. These water availability and quality improvements could have important ramifications for fishery resources along these river systems.

Seasonal, semi-permanent and permanent riparian-oriented wetlands are involved with this effort. These systems will provide the floodwater retention benefits described above, and additionally, provide the ability to retain agricultural tailwaters from over 10,000 acres of irrigated farmlands that exist in the Stevinson region and drain into the Stevinson riparian wetlands. Due to the diversity of wetland types inherent to the Stevinson system, the improved management capability provided by this project will allow drawdown periods to be conducted throughout spring and summer months. These managed water releases could improve downstream water use.

The Stevinson Project was initiated in 2000, with habitat improvements being realized on 230 acres of riparian wetlands. This project will be completed with further habitat improvements on approximately 1,300 acres of riparian wetlands in 2001 and 2002.

Evaluating the environmental effectiveness of habitat development is an important process to ensure program goals are met, and to present alternatives for appropriate management. This proposal requests CALFED's assistance as a partner by funding the monitoring aspect of this important project.

Due to the importance of Central Valley riparian wetlands to migratory and local waterbirds; habitat dynamics and waterbird utilization of these systems will be evaluated for three years, beginning in 2002. The goal of this monitoring program is to determine the environmental effectiveness of this project and to develop water management alternatives to maximize waterbird utilization of these systems.

### *Quantifiable Objectives*

Since this wetland restoration/enhancement project will improve management capability of approximately 1,500 acres of riparian wetlands in the Stevinson District, this effort will address ***Quantifiable Objective 160*** by providing long-term diversion flexibility to increase water supply for beneficial uses.

## ***Technical/Scientific Merit, Feasibility, Monitoring, and Assessment***

### **4. Methods and procedures.**

Riparian wetland habitats will be restored on lands previously converted to agricultural purposes, and existing habitats will be enhanced by improving water management capability. Both restoration and enhancement work will involve earth moving activities and implementation of appropriate water control structures to achieve effective water delivery and drainage capabilities. Waterbird density and habitat selection will be determined within Stevinson riparian wetland complexes. Waterbird habitat use will be compared with various hydrological parameters to determine water management strategies that will optimize habitat benefits for waterbirds that depend upon Central Valley wetlands to fulfill various life cycle requirements. Determination of waterbird density and habitat selection will approximate the methodology used by Laubhan and Gammonly (2000).

#### ***Habitat Availability***

Wetland types will be categorized and their spatial distribution across the Stevinson district complex mapped by utilizing aerial photographs. Habitats will be digitized and incorporated into a geographical information system (GIS), and stratified-random sample of study plots will be identified and developed across the Stevinson complex. Vegetation (visual obstruction (Robel et al 1970), vegetation height), water (depth, area flooded) and invertebrate (abundance) parameters will be determined in each study plot.

#### ***Waterbird Density***

Randomly placed parallel transects will be developed across the Stevinson complex and integrated with the GIS. Observers will walk each transect and record the perpendicular distance, habitat type and number of waterbird species visible from the transect line. Distance sampling (Buckland et al 1993) and the software program DISTANCE (Laake et al 1994) will be used to estimate the density of waterbirds in each habitat type.

### **5. Schedule (see Appendix 7)**

### **6. Monitoring and assessment.**

Project data analysis will be conducted, and reports will be developed on a quarterly basis along with annual reports presented in December of each project year. Data will be entered in an appropriate software program and analyzed using various statistical techniques. Final project results will be published in relevant scientific and popular outlets targeting natural resource and water management professionals.

## **C. Outreach, Community Involvement, and Information Transfer.**

### **1. Outreach to disadvantaged communities**

SWD and MCWD are economically challenged communities, with a low annual income per capita. Their population is approximately 250 people. The average size of parcel is 20 acres. The local elementary school ranks low county wide in testing due in part to a high mobility rate. Merquin District lands are also challenged economically owing to high water table, poor drainage and continued surface water application. Soil pH is high and cropping patterns are salt tolerant. They need to use well water to lower the water table, which will improve drainage. Well operation is more costly than surface water and it is not economically feasible for their customers in many cases. SWD proposes to reimburse Merquin for water efficiency improvements and groundwater pumping costs in excess of surface water costs, provided Merquin will pump groundwater when requested, where feasible and when there is not a significant adverse impact to soil or groundwater overdraft. This conjunctive use proposal will enhance drainage without increasing the cost of water to Merquin. Stevinson will be able to make water available for sale to outside customers at a higher price that will enable Stevinson to pay Merquin's increased costs. This project will answer Merquin's need for improved soil productivity and drainage within their ability to afford to deal with those needs, while at the same time make higher quality water available for export out of district. This project addresses the needs of the local community

### **2. Training, employment, and capacity building potential.**

Academic professionals and technicians will perform the monitoring program proposed in this CALFED grant request. One doctoral graduate student will direct this project from initiation to completion, and two academic technicians (wildlife biologists obtaining experience for future employment/academic enhancement) will work on this effort each year.

### **3. Information dissemination.**

Project results will be published in popular and scientific publications. This effort will also be introduced to various interest groups through various local events such as the annual Wild on Wetlands Weekend sponsored by the Grassland Resource Conservation District.

### **4. Letter to FWS regarding notification of proposal submittal (see Appendix 8).**

## **D. Qualifications of the Applicants, Cooperators, and Establishment of Partnerships.**

- 1 Randy Riviere, Wildlife Biologist and President of Riviere & Associates, an environmental consulting and management firm, will direct activities associated with the Stevinson Project, and the waterbird monitoring program. Mr. Riviere's

resume can be found in Appendix 6. The monitoring aspect will also involve the professional oversight of Dr. Leigh Fredrickson of the University of Missouri and Dr. Fredrick Reid of Ducks Unlimited.

- 2 SWD, Stevinson, the North American Wetlands Conservation Council, U.S. Fish and Wildlife Service, Ducks Unlimited, and Riviere & Associates have developed a partnership to restore and enhance riparian wetlands in the Stevinson Project. Riviere and Associates, Ducks Unlimited, the FWS and the University of Missouri will cooperate on the monitoring aspect of this project.
- 3 The U.S. Fish and Wildlife Service and Ducks Unlimited obtained a grant from the North American Wetlands Conservation Council to restore/enhance wildlife habitats on Stevinson. A private landowner match is an essential component of acquisition of this grant, so a partnership was initiated with the Stevinson and Riviere & Associates to perform riparian wetland habitat restoration/enhancement on Stevinson lands to impact additional wildlife habitat and satisfy the requirements of the NAWCA grant.

## E. Costs and Benefits

### 1. Budget summary and breakdown.

	NAWCA/ FWS/DU	CALFED	Stevinson	Riviere & Associates
a. Salaries and wages				
N/A				
b. Fringe benefits				
N/A				
c. Supplies – monitoring				\$3,000
d. Equipment – monitoring				\$2,000
e. Services/consultants				
• Riparian wetland enhancement	\$167,050		\$167,050	
• Monitoring program		\$70,000		
f. Travel				
N/A				
g. Other direct costs				
N/A				
h. Total estimated costs:	\$409,100			

### 2. Budget justification.

Riparian wetland restoration/enhancement work requires earthmoving and water control structure installation efforts that are being accomplished by Riviere & Associates. Wildlife technicians will be required to perform the fieldwork involved with the monitoring program. Project supervision performed by Riviere & Associates will be

necessary to ensure project goals are met in an effective and timely manner. Riviere & Associates will provide supplies and equipment.

### 3. Benefit summary and breakdown.

The Stevinson Project involves over 1,500 acres of riparian wetlands in the Stevinson district. The increased water management capability achieved by this project within the Stevinson seasonal, semi-permanent and permanent riparian wetlands will give Stevinson the ability, during non-drought years, to capture a minimum of 1,500 AF of normally irrecoverable waters which can, in turn, be released at periods more favorable for downstream use. These wetland systems also receive agricultural drain waters from over 10,000 acres of farmland in the Stevinson district. Enhancement of water management capability in these systems will allow these wetlands to be utilized to realize water quality improvements for downstream use, particularly fishery resources.

Both Stevinson and CALFED will benefit by increased water supply provided by the Stevinson Project. CALFED will benefit from increased water quality provided by Stevinson wetlands. All partners in this wetland restoration/enhancement and waterbird monitoring effort (Stevinson, NAWCA, FWS, DU, Riviere & Associates) will benefit from the habitat improvements and improved habitat management capability realized by the Stevinson riparian wetland restoration/enhancement project, and the habitat management strategies that will be made available due to the information provided by the monitoring program.

### 4. Assessment of costs and benefits.

The Stevinson Project will cost all partners a combined total of \$334,100. The \$70,000 requested from CALFED to fund the monitoring program represents approximately 20% of project cost.

### **Summary of quantifiable costs/benefits**

<u>Project Beneficiaries</u>	<u>Contribution</u>	<u>Benefits Obtained</u>
Stevinson	\$175,900	<ul style="list-style-type: none"> <li>• A minimum of 350 AF of increased in-district water supply during non-drought years.</li> <li>• Increased conjunctive use of water resources.</li> <li>• A minimum of 1,500 AF of increased water supply potential during non-drought years.</li> <li>• Increased management flexibility regarding a minimum of 1,500 AF of water for potential downstream use during non-drought years.</li> </ul>
SWD, MCWD		
CALFED	\$70,000	<ul style="list-style-type: none"> <li>• Increased water quality involving a minimum of 1,500 AF of water during non-drought years.</li> <li>• Stevenson Project enhancement of wetlands improves water quality of all SWD drainage to river system.</li> <li>• Potential source of water towards CALFED's Environmental Water Account</li> </ul>

### **Summary of non-quantifiable costs/benefits**

<u>Project Beneficiaries</u>	<u>Contribution</u>	<u>Benefits Obtained</u>
Stevinson	\$175,900	<ul style="list-style-type: none"> <li>• Increased recreational use</li> <li>• Increased district aesthetics</li> <li>• Environmental benefits</li> </ul>
NAWCA/FWS/DU	\$175,900	
CALFED	\$70,000	<ul style="list-style-type: none"> <li>• Environmental benefits</li> </ul>
Riviere & Associates	\$5,000	<ul style="list-style-type: none"> <li>• Obtain management information that will help serve clients.</li> </ul>

### *Literature Cited*

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- Laake, J. L., S. T. Buckland, D. R. Anderson, and K. P. Burnham. 1994. DISTANCE users guide, version 2.1. Colorado Cooperative Fish and Wildlife Research Unit, Colorado State University, Fort Collins, Colorado, USA.
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Appendix 1. Birds that use wetlands in the San Joaquin River Basin.

Common name	Scientific name
Northern pintail	<i>Anas acuta</i>
Gadwall	<i>Anas strepera</i>
Green-winged teal	<i>Anas crecca</i>
Northern shoveler	<i>Anas clypeata</i>
Mallard	<i>Anas platyrhynchos</i>
Cinnamon teal	<i>Anas cyanoptera</i>
American wigeon	<i>Anas americana</i>
Wood duck	<i>Aix sponsa</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
Ring-necked duck	<i>Aythya collaris</i>
Lesser scaup	<i>Aythya affinis</i>
Redhead	<i>Aythya americana</i>
Canvasback	<i>Aythya valisineria</i>
Bufflehead	<i>Bucephala albeola</i>
Common merganser	<i>Mergus merganser</i>
Snow geese	<i>Chen caerulescens</i>
Ross' geese	<i>Chen rossi</i>
Cackling Canada geese	<i>Branta canadensis minima</i>
Aleutian Canada geese	<i>Branta canadensis leucopareia</i>
Western Canada geese	<i>Branta canadensis moffitti</i>
Greater white-fronted geese	<i>Anser albifrons</i>
Tundra swan	<i>Cygnus columbianus</i>
Black-bellied plover	<i>Pluvialis squatarola</i>
Killdeer	<i>Charadrius vociferus</i>
Black-necked stilt	<i>Himantopus mexicanus</i>
American avocet	<i>Recurvirostra americana</i>
Greater yellowlegs	<i>Tringa melanoleuca</i>
Long-billed curlew	<i>Numenius americanus</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
Dunlin	<i>Calidris alpina</i>
Dowitchers spp.	<i>Limnodromus spp.</i>
Common snipe	<i>Gallinago gallinago</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Eared grebe	<i>Podiceps nigricollis</i>
American white pelican	<i>Pelecanus erythrorhynchos</i>
Double-crested cormorant	<i>Phalacrocorax auritus</i>
American bittern	<i>Botaurus lentiginosus</i>
Black-crowned night heron	<i>Nycticorax nycticorax</i>
Snowy egret	<i>Egretta thula</i>
Great egret	<i>Casmerodius albus</i>

Appendix 1. (Cont.)

Common name	Scientific name
Great blue heron	<i>Ardea herodias</i>
White-faced ibis	<i>Plegadis chihi</i>
Lesser sandhill crane	<i>Grus canadensis</i>
Virginia rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Common moorhen	<i>Gallinula chloropus</i>
American coot	<i>Fulica americana</i>
Ring-billed gull	<i>Larus delawarensis</i>
Herring gull	<i>Larus argentatus</i>
California gull	<i>Larus californicus</i>
Forster's tern	<i>Sterna forsteri</i>
Black tern	<i>Chlidonias niger</i>
Caspian tern	<i>Sterna caspia</i>
Water pipit	<i>Anthus spinoletta</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Tricolored blackbird	<i>Agelaius tricolor</i>
Song sparrow	<i>Melospiza melodia</i>
Marsh wren	<i>Cistothorus palustris</i>

## Appendix 2. Mammals that use wetlands in the San Joaquin River Basin

Common name	Scientific name
Virginia opossum	<i>Didelphis virginiana</i>
Black-tailed hare	<i>Lepus californicus</i>
Desert cottontail	<i>Sylvilagus audubonii</i>
Riparian brush rabbit	<i>Sylvilagus bachmani riparius</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
Little pocket mouse	<i>Perognathus longimembris longimembris</i>
San Joaquin pocket mouse	<i>Perognathus inornatus inornatus</i>
Heermann's kangaroo rat	<i>Dipodomys heermanni</i>
Fresno kangaroo rat	<i>Dipodomys nitratooides exilis</i>
Giant kangaroo rat	<i>Dipodomys ingens</i>
Beaver	<i>Castor canadensis</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Southern grasshopper mouse	<i>Onychomys torridus</i>
California vole	<i>Microtus californicus</i>
Muskrat	<i>Ondatra zibethicus</i>
Mink	<i>Mustela vison</i>
Coyote	<i>Canis latrans</i>
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>
Red fox	<i>Vulpes vulpes</i>
Raccoon	<i>Procyon lotor</i>
Southwestern river otter	<i>Lutra canadensis sonarae</i>
Striped skunk	<i>Mephitis mephitis</i>

### Appendix 3. Birds that use riparian habitats in the San Joaquin River Basin

Common name	Scientific name
Wood duck	<i>Aix sponsa</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Common merganser	<i>Mergus merganser</i>
Great egret	<i>Casmerodius albus</i>
Snowy egret	<i>Egretta thula</i>
Great blue heron	<i>Ardea herodias</i>
White-faced ibis	<i>Plegadis chihi</i>
Mourning dove	<i>Zenaida macroura</i>
Western kingbird	<i>Tyrannus verticalis</i>
Ash-throated flycatcher	<i>Myiarchus cinerascens</i>
Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Barn swallow	<i>Hirundo rustica</i>
Marsh wren	<i>Cistothorus palustris</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Yellow warbler	<i>Dendroica petechia</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Blue grosbeak	<i>Guiraca caerulea</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
Song sparrow	<i>Melospiza melodia</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
Northern oriole	<i>Icterus galbula</i>
Pine siskin	<i>Carduelis pinus</i>
American goldfinch	<i>Carduelis tristis</i>
Solitary vireo	<i>Vireo solitarius</i>
Hermit thrush	<i>Catharus guttatus</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Black phoebe	<i>Sayornis nigricans</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
California quail	<i>Callipepla californica</i>
Scrub jay	<i>Aphelocoma coerulescens</i>
Yellow-billed magpie	<i>Pica nuttalli</i>
American crow	<i>Corvus brachyrhynchos</i>
Northern flicker	<i>Colaptes auratus</i>
Acorn woodpecker	<i>Melanerpes formicivorus</i>
Lewis' woodpecker	<i>Melanerpes lewis</i>
Downy woodpecker	<i>Picoides pubescens</i>

Appendix 3. (Cont.)

Common name	Scientific name
Hairy woodpecker	<i>Picoides villosus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Swainson's hawk	<i>Buteo swainsoni</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
American kestrel	<i>Falco sparverius</i>
Long-eared owl	<i>Asio otus</i>
Great horned owl	<i>Bubo virginianus</i>
Western screech owl	<i>Otus kennicottii</i>

#### Appendix 4. Mammals that use riparian habitats in the San Joaquin River Basin

Common name	Scientific name
Virginia opossum	<i>Didelphis virginiana</i>
Ornate shrew	<i>Sorex ornatus</i>
Broad-footed mole	<i>Scapanus latimanus</i>
California myotis	<i>Myotis californicus</i>
Yuma myotis	<i>Myotis yumanensis</i>
Small-footed myotis	<i>Myotis leibii</i>
Long-legged myotis	<i>Myotis volans</i>
Long-eared myotis	<i>Myotis evotis</i>
Fringed myotis	<i>Myotis thysanodes</i>
Arizona myotis	<i>Myotis lucifugus occultus</i>
Red bat	<i>Lasiurus borealis</i>
Hoary bat	<i>Lasiurus cinereus</i>
Big brown bat	<i>Eptesicus fuscus</i>
Western pipistrelle	<i>Pipistrellus hesperus</i>
Pallid bat	<i>Antrozous pallidus</i>
Townsend's big-eared bat	<i>Plecotus townsendii townsendii</i>
Spotted bat	<i>Euderma maculatum</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
California mastiff bat	<i>Eumops perotis californicus</i>
Black-tailed hare	<i>Lepus californicus</i>
Desert cottontail	<i>Sylvilagus audubonii</i>
Riparian brush rabbit	<i>Sulvilagus bachmani riparius</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
San Joaquin antelope squirrel	<i>Ammospermophilus nelsoni</i>
Southwestern pocket gopher	<i>Thomomys bottae</i>
Little pocket mouse	<i>Perognathus longimembris longimembris</i>
San Joaquin pocket mouse	<i>Perognathus inornatus inornatus</i>
Heermann's kangaroo rat	<i>Dipodomys heermanni</i>
Fresno kangaroo rat	<i>Dipodomys nitratooides exilis</i>
Giant kangaroo rat	<i>Dipodomys ingens</i>
Beaver	<i>Castor canadensis</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Southern grasshopper mouse	<i>Onychomys torridus</i>
Riparian woodrat	<i>Neotoma fuscipes riparia</i>
California vole	<i>Microtus californicus</i>
Muskrat	<i>Ondatra zibethicus</i>
House mouse	<i>Mus musculus</i>
Norway rat	<i>Rattus norvegicus</i>
Black rat	<i>Rattus rattus</i>
Coyote	<i>Canis latrans</i>
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>

#### Appendix 4. (Cont.)

Common name	Scientific name
Red fox	<i>Vulpes vulpes</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Raccoon	<i>Procyon lotor</i>
Mink	<i>Mustela vison</i>
Long-tailed weasel	<i>Mustela frenata</i>
Southwestern river otter	<i>Lutra canadensis sonora</i>
Badger	<i>Taxidea taxus</i>
Striped skunk	<i>Mephitis mephitis</i>
Western spotted skunk	<i>Spilogale gracilis</i>

## Appendix 5. Fish species found in the San Joaquin River Basin

Common name	Scientific name
Sacramento blackfish	<i>Orthodon microlepidotus</i>
Hitch	<i>Lavinia exilicauda</i>
Threadfin shad	<i>Dorosoma petenense</i>
Carp	<i>Cyprinus carpio</i>
Goldfish	<i>Carassius auratus</i>
Fathead minnow	<i>Pimephales promelas</i>
Red shiner	<i>Cyprinella lutrensis</i>
Channel catfish	<i>Ictalurus punctatus</i>
White catfish	<i>Ictalurus catus</i>
Western mosquitofish	<i>Gambusia affinis</i>
Inland silverside	<i>Menidia beryllina</i>
Largemouth bass	<i>Micropterus salmoides</i>
Bluegill	<i>Lepomis macrochirus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Redear sunfish	<i>Lepomis microlophus</i>
Bigscale logperch	<i>Percina macrolepida</i>
Pacific lamprey	<i>Lampetra tridentata</i>
Chinook salmon	<i>Oncorhynchus tshawytscha</i>
Striped bass	<i>Morone saxatilis</i>
White sturgeon	<i>Acipenser transmontanus</i>

Appendix 6. Randy Riviere's resume and background regarding Riviere & Associates,  
Environmental Consulting and Management.

## Appendix 7. Schedule

## Appendix 8. Letter to FWS regarding notification of proposal submittal

## 5. Schedule

Tasks																			
Enhancement/Restoration																			
Habitat Availability																			
Categorize wetland habitat types																			
Determine wetland spatial distribution																			
Digitize wetland habitat types and integrate with GIS																			
Develop study plots																			
Sample vegetation, water and invertebrate parameters																			
Waterbird Density																			
Develop transect system																			
Integrate transects with GIS																			
Perform waterbird surveys																			
Data organization and entry																			
Analysis																			
Prepare quarterly report																			
Prepare annual report																			
Prepare final report																			
Publish results in professional outlet																			
Develop comprehensive management plan																			
	July-Sep	Oct-Dec	Jan-Mar	Apr-June	July-Sep	Oct-Dec	Jan-Mar	Apr-June	July-Sep	Oct-Dec	Jan-Mar	Apr-June	July-Sep	Oct-Dec	Jan-Mar	Apr-June	July-Sep		
	2000				2001				2002				2003				2004		
<b>Budget</b>	\$84,900			\$38,600	\$147,000	\$5,000	\$5,000	\$40,000	\$39,200	\$3,500	\$7,800	\$7,800	\$3,500		\$7,800	\$7,800	\$11,200	<b>Total</b>	<b>\$409,100</b>